Cardiothoracic Anesthesia, Respiration and Airway

Confirmation of internal jugular guide wire position utilizing transesophageal echocardiography

[Confirmation de la position d'un guide métallique dans la veine jugulaire interne en utilisant l'échocardiographie transœsophagienne]

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Purpose: To describe the utility of transesophageal echocardiography (TEE) in confirmation of correct central line J-wire position.

Clinical features: A 51-yr-old male patient presented for urgent coronary artery bypass grafting. Current medications included aspirin, nitroglycerine, heparin and a B-blocker. Physical examination was unremarkable. Initial difficulty with right internal jugular vein cannulation was encountered. A posterior approach was used to access the vein with further difficulty in passing the J-wire. Simultaneous TEE images confirmed the correct J-wire position.

Conclusion: The case demonstrates the value of TEE to confirm correct guide wire position prior to insertion of a large bore central venous catheter. TEE visualization of J-wire position avoided repeat attempts at internal jugular cannulation and potential carotid artery puncture.

Objectif : Décrire l'utilité de l'échocardiographie transœsophagienne (ETO) pour confirmer la position correcte d'un guide en J.

Éléments cliniques : Un homme de 51 ans s'est présenté pour un pontage aorto-coronarien d'urgence. Le patient était déjà traité avec de l'aspirine, de la nitroglycérine, de l'héparine et un B-bloquant. L'examen physique a été sans particularité. Dès la première tentative, la canulation de la veine jugulaire interne droite s'est révélée difficile. Une approche postérieure a été utilisée pour accéder à la veine, mais le passage du guide en J a été aussi difficile. Les images de l'ETO simultanées ont confirmé la position correcte du guide en J.

Conclusion : Le présent cas démontre la valeur de l'ETO pour confirmer la position d'un guide métallique avant l'insertion d'un cathéter veineux central de grand calibre. La visualisation ETO de la position du guide en J évite la répétition des essais de canulation de la veine jugulaire interne et la perforation possible de l'artère carotide.

INTRAOPERATIVE transesophageal echocardiography (TEE) is gaining acceptance as a routine monitor and diagnostic tool for patients having cardiovascular surgery. We describe a case of difficult central venous access that utilized TEE to confirm correct J-wire position prior to inserting a large-bore central venous catheter. TEE confirmation avoided repeat attempts at cannulation and potential complications related to carotid artery puncture.

Case report

A 51-yr-old male crane operator presented for urgent coronary artery bypass grafting (CABG). His past medical history was significant for unstable angina, hypertension and hyperlipidemia. He had previous general anesthetics without difficulty and had no allergies to medications. Current medications included aspirin, atenolol, nitroglycerin, ramipril, simvastatin, omeprazole, and heparin.

On physical examination his vital signs were stable and he measured 91 kg and 170 cm. He had a short muscular neck but otherwise normal airway assessment. The rest of his physical examination was unremarkable. Laboratory data, chest *x-ray*, and electrocardiograph were normal. His coronary angiogram demonstrated severe coronary disease involving the proximal left anterior descending, circumflex, and right coronary artery. His left ventriculogram was normal.

Preoperative consent for anesthesia including central venous cannulation and TEE was obtained.

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Following the induction of general anesthesia with sufentanil, midazolam, and pancuronium, the airway was secured. An adult omniplane TEE probe was placed easily into the esophagus and the attending anesthesiologist initiated a complete TEE examination. During the same time interval a second anesthesiologist inserted a central venous cannula. Initial difficulty with cannulation of the right internal jugular via the anterior approach was encountered and a posterior approach was utilized to access the vein. Correct cannulation with a 16 G needle was thought to be obtained. However, difficulty with passing the J-wire into the internal jugular vein was encountered.

A simultaneous echocardiographic image of the superior vena cava and right atrium was obtained to confirm correct position of the J-wire (Figures 1 and 2). The view is the standard Bicaval view and is obtained at midesophageal level with approximately 90–130 of transducer rotation. The images clearly demonstrate correct positioning of the J-wire within the right atrium and the central vein was successfully cannulated without further difficulty.

Discussion

The incidence of accidental puncture of the carotid artery with a small bore needle is reported to be 2–8% and is associated with little morbidity or mortality.¹ Large-bore introducer sheath insertion into the carotid artery is associated with significant mortality and morbidity. Significant clinical morbidity includes bleeding, neck hematoma formation with compression of the airway, and cerebrovascular accidents. Incidence of this complication has been reported to be approximately 1:10 000. Visualization of the right atrium and superior vena cava is part of a complete TEE examination.² Foreign bodies such as guidewires within the heart are highly echogenic and easily visualized. This case demonstrates the potential value of TEE to confirm proper guide wire position, especially when difficulty in passing the guide wire is encountered, prior to introduction of the introducer sheath into the internal jugular vein.

Limitations of TEE visualization of the guide wire placement include concurrent presence of other foreign bodies within the right atrium such as pacemaker wires that are also highly echogenic and may produce image artifacts mimicking the guide wire. This limitation may be overcome by visualizing the wire in two different TEE imaging planes.

Our institution currently has an intraoperative TEE program whereby the majority of intraoperative TEE examination are performed by a dedicated trained echographer from Anesthesiology or Cardiology. This

FIGURE 1 (Bicaval View) Demonstrates the guide wire (arrow) passing through the Superior Vena Cava (SVC) into the Right Atrium (RA). IVC=Inferior Vena Cava, LA=Left Atrium

FIGURE 2 (Bicaval View) Similar picture to figure 1, the guide wire (arrows) is clearly visualized in the right Atrium. SVC=Superior Vena Cava, RA=Right Atrium, IVC=Inferior Vena Cava and LA=Left Atrium.

case illustrates a major advantage of this system. The availability of a dedicated echographer at the induction of anesthesia following intubation is utilized in our institution to facilitate a complete examination prior to sternotomy. Early examination avoids the interference of cautery on the Doppler assessments and provides early information to the anesthesiologist and surgeon on ventricular filling, performance, and valvular function. In addition, the availability of the dedicated echographer in this case provided rapid and accurate reassurance of correct placement of a central venous guide wire.

References

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